

ODV – New Developments



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1. ODV version 4.6.0

2. ODV API

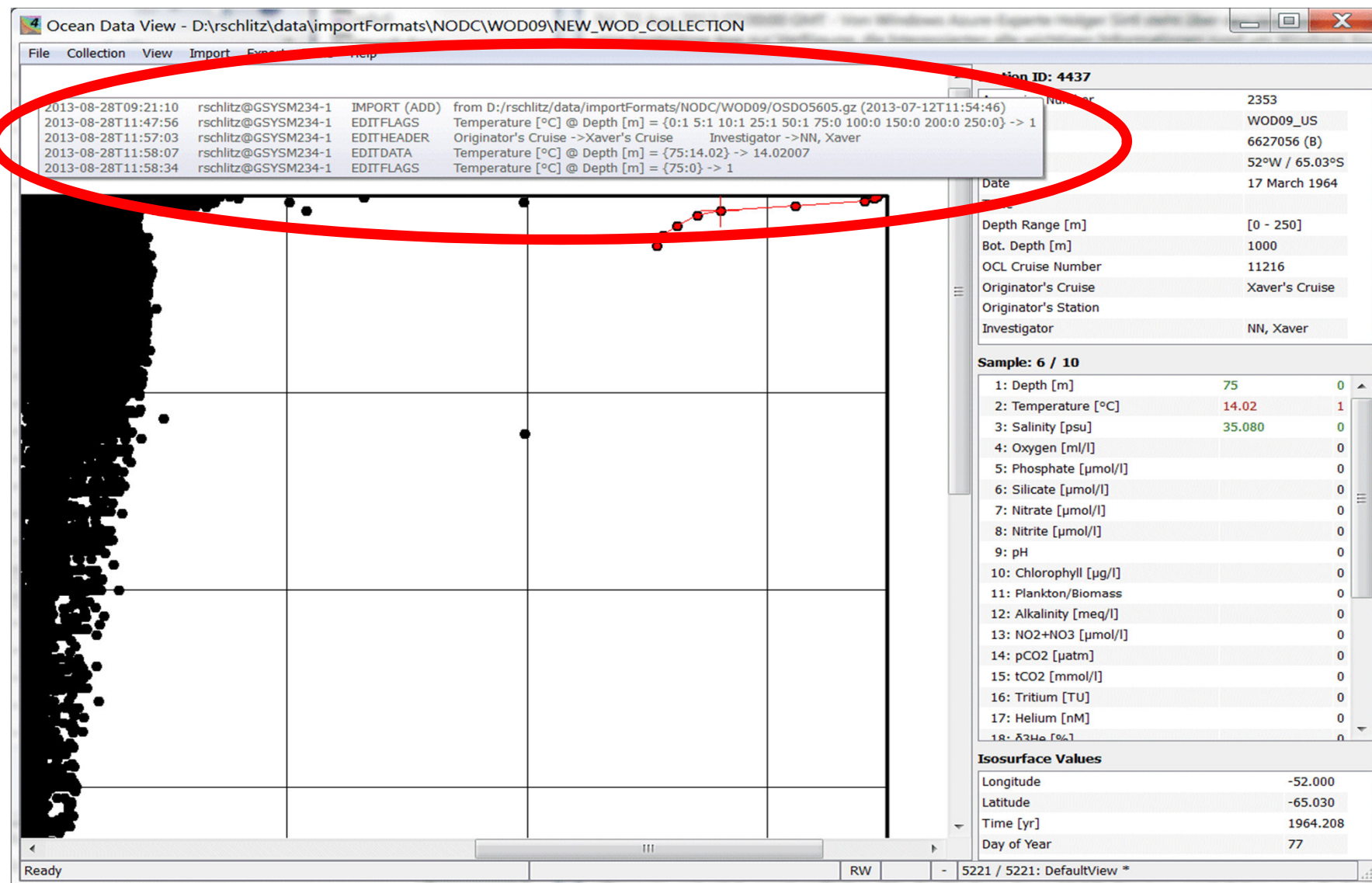
- ***beta available now***
- ***to be released fall 2013 before mid-term review***

1. ODV version 4.6.0

New ODV collection format **ODVCF6**

- ***New **INDEXED_TEXT** data type allowing efficient handling of arbitrary length strings. This permits extended meta variable support***
- ***Per-station data history recording data origin and data edit operations (included when copying or exporting data)***

Per-station data history



Per-station data history in spreadsheet files

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41 //<History>2013-08-28T09:21:10 rschlitz@GSYSM234-1 IMPORT (ADD) from D:/rschlitz/data/importFormats/NODC/WOD09/OSD05704.gz (2
42 WOD09_US 530397 B 1968-02-19 317.24200 -72.76700 2044 8037 0188 Xaver3 0.00 0
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56 //<History>2013-08-28T09:21:10 rschlitz@GSYSM234-1 IMPORT (ADD) from D:/rschlitz/data/importFormats/NODC/WOD09/OSD05704.gz (2
57 //<History>2013-08-28T12:54:07 rschlitz@GSYSM234-1 EDITHEADER Investigator ->Xaver </History>
58 //<History>2013-08-28T13:10:27 rschlitz@GSYSM234-1 EDITHEADER all Investigator Xaver1->Xaver3 </History>
59 //<History>2013-09-22T12:16:10 rschlitz@GSYSM234-1 EDITFLAGS Salinity [psu] @ Depth [m] = {807:0} -> 1</History>
60 //<History>2013-09-22T12:16:44 rschlitz@GSYSM234-1 EDITDATA Oxygen [ml/l] @ Depth [m] = {147:7.09} -> 7.090004</History>
61 //<History>2013-09-22T12:17:15 rschlitz@GSYSM234-1 DELETEDATA Nitrate [Îmol/l] @ Depth [m] = {147:28.4}</History>

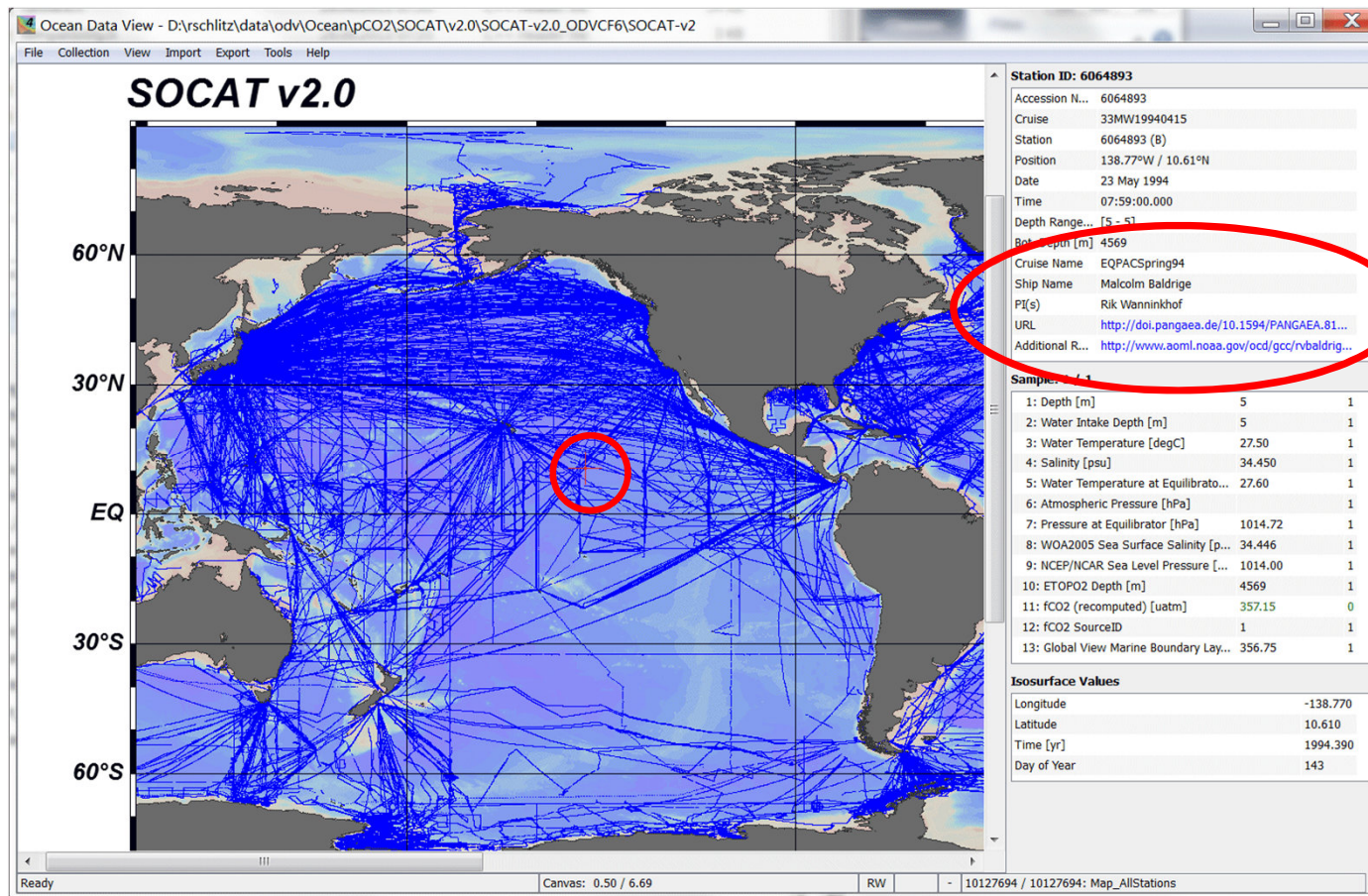
```

- *Data block*
- *History block*

//<History> </History>

Extended Metadata Support in ODV

Example: *SOCAT v2 pCO₂ Data*

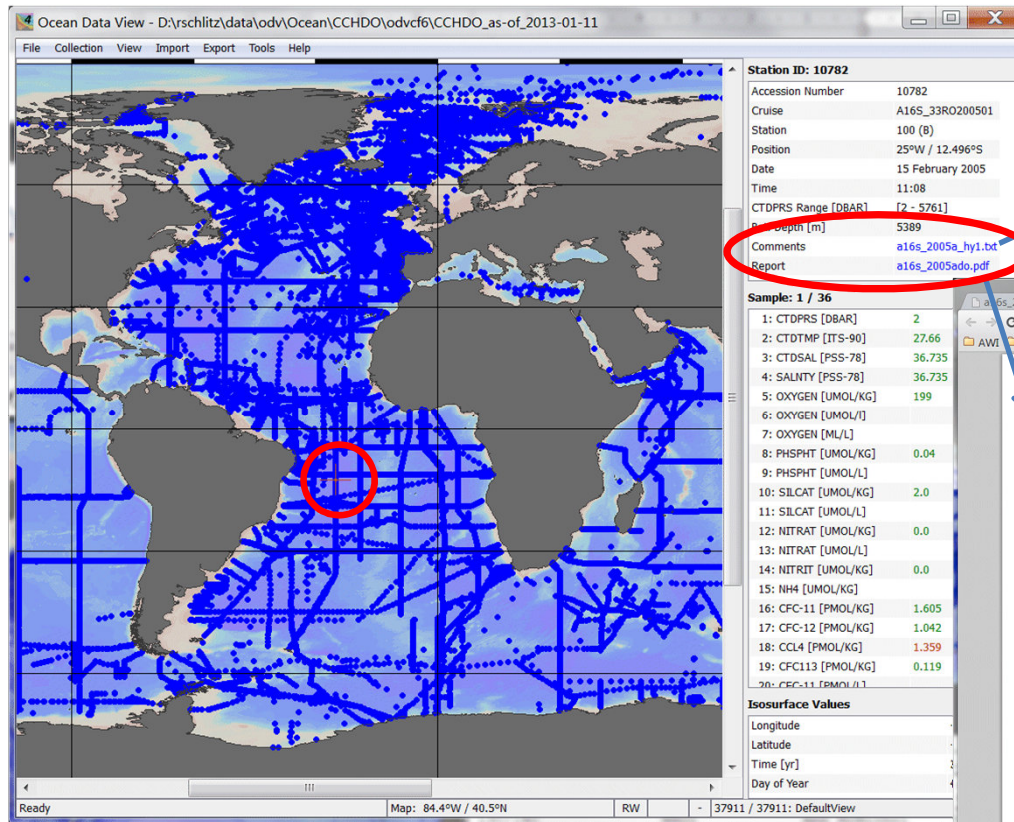


Clicking on any one of the more than 10 million stations instantly shows cruise, ship and PI information.

Clicking on the blue URLs brings up the data description documents in the web browser

Extended Metadata Support in ODV

Example: CCHDO Data (courtesy J. Swift and S. Diggs)

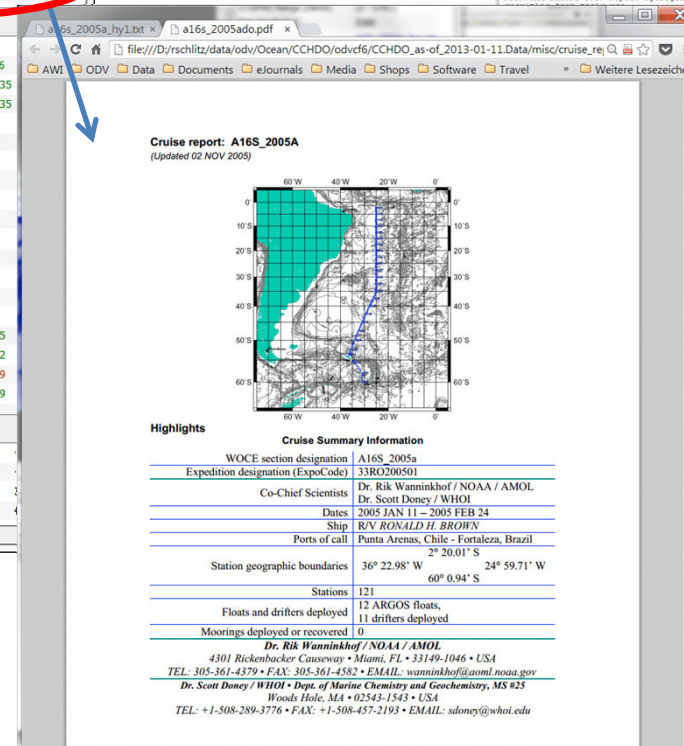


clickable links

Header from hy1.csv file

```
code : Justin Fields merge_exchange.rb
original files copied from HTML directory: 2011-08-31
original STD file:
/data/codclivar/atlantic/a16/a16s_2005a/original/2011.08.25_carbon_cherys/original_hy1.csv
2011-08-31
BOTTLE:201009130CCHDO:00000000
code:copy_exchange_bin_018
citations added by A. Rea
BOTTLE:20091030CCHDO:00000000
code : Justin Fields merge_exchange.rb
PARAMETER/PROGRAM Institution Principal investigator
CTD PML/ACML Greg Johnson/Nolly Baringer
Salinity PML/ACML Greg Johnson
CFCs UW/PML Mark Warner/John Bullister
HPCFs UW/PML Shari Von-Lewis
DIC ZMDO Rik Wanninkhof/Dick Feely
Discrete pCO2 AGMG Rik Wanninkhof
RNOA-S-Q, Miami Chris Langdon
Nutrients UW/AGMG Calvin Moroy/Jia-Zhong Zhang
Wellum/Tritium LDEO Peter Schlosser
CO2-Alkalinity RNOA-S-Q, Miami Frank Millero
CO2-pH RNOA-S-Q, Miami Frank Millero
DOC RNOA-S-Q, Miami Dennis Hansell
CDOM OCSB Norm Nelson/Craig Carlson
Underway pCO2 AGMG Rik Wanninkhof
13C/14C WHOI Ann Hotholol
ADCP/LADCP U. Hawaii/LDEO Eric Piling/Andreas Thurnherr
Aerosols CMT Anna Johansen
BAM/CO2 U. Montana Mike Delandre
CO2 System Develop. USF Robert Byrne

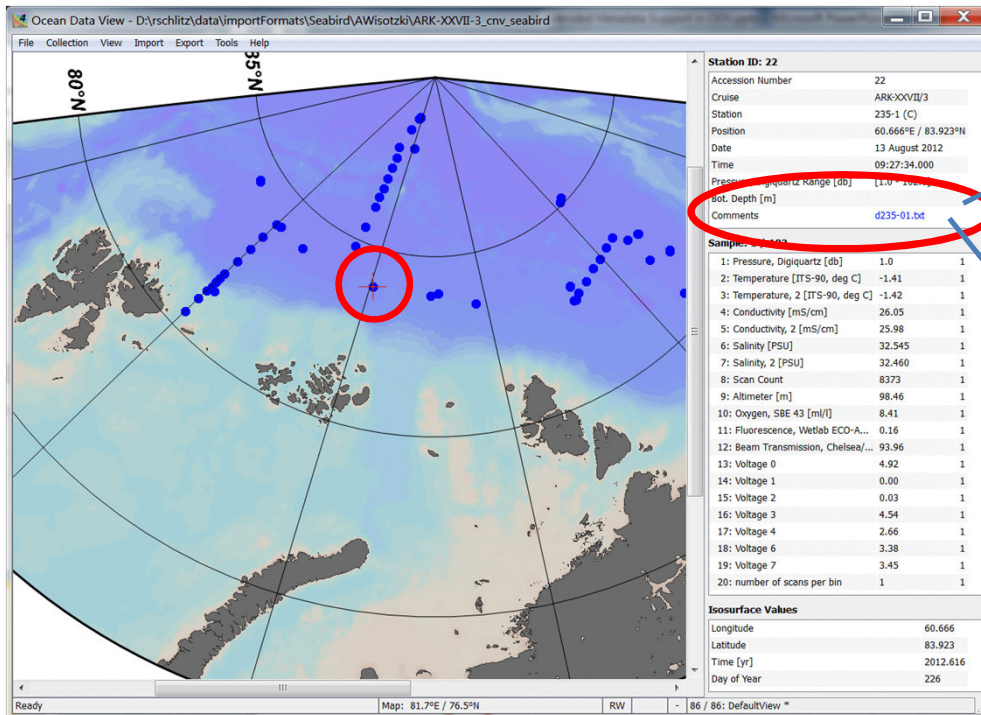
Following American Geophysical Union recommendations,
the data should be cited as: data provider(s), cruise name
or cruise ID, data file name(s) CLIVAR and Carbon Hydrographic
Data Office, La Jolla, CA, USA, and data file date. For further
information, please contact one of the parties listed above or
cchdo@ucsd.edu. Users are also requested to acknowledge the
NSF/NOAA-funded U.S. Repeat Hydrography Program in publications
```



Extended Metadata Support in ODV

Example: *Sea-Bird .cnv Data*

Header from .cnv file containing additional metadata

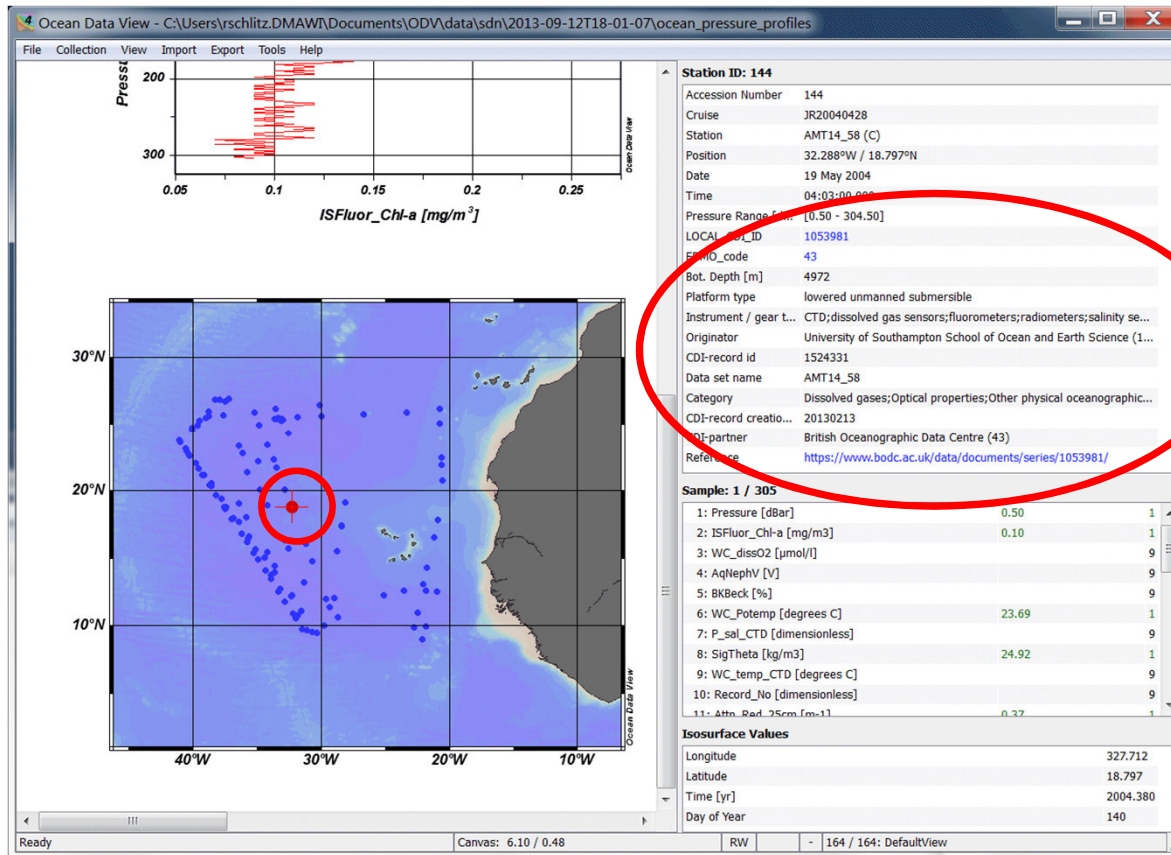


The screenshot shows a text file with metadata for a Sea-Bird SBE 9 Data File. The file contains information about the ship (V8 Polarstern), cruise (ARK-XXVII/3), operator (RS/SR), and station (234-1). It also lists various sensors and their units, such as pressure, temperature, conductivity, salinity, and oxygen. A red circle highlights the 'Ship Cruise Operator Station' information. Another red circle highlights the 'Sensor Identification and Calibration Data' section, which includes details about the sensors used, their serial numbers, and calibration dates.

```
Sea-Bird SBE 9 Data File:
* FileName = C:\TD\ARK-XXVII-3\conf2\raw\234-1.hex
* Software Version Seasave V 7.19
* Temperature SN = 1373
* Conductivity SN = 1198
* Number of Bytes Per Scan = 37
* Number of Voltage Words = 4
* Number of Scans Averaged by the Deck Unit = 1
* System Upload Time = Aug 12 2012 11:59:31
* NMEA Latitude = 83 59.35 N
* NMEA Longitude = 60 46.6 E
* NMEA UTC (Time) = Aug 12 2012 11:59:29
* Store Lat/Lon Data = Append to Existing Scan
* Ship: V8 Polarstern
** Cruise: ARK-XXVII/3
** Operator: RS/SR
** Station/Cast: 234-1
# nquan = 21
# units = specified
# name 0 = prDM: Pressure, Digiquartz [db]
# name 1 = t090C: Temperature [ITS-90, deg C]
# name 2 = t190C: Temperature, 2 [ITS-90, deg C]
# name 3 = c0mS/cm: Conductivity [mS/cm]
# name 4 = c1mS/cm: Conductivity, 2 [mS/cm]
# name 5 = sal100: Salinity [PSU]
# name 6 = sal11: Salinity, 2 [PSU]
# name 7 = scan: Scan Count
# name 8 = altM: Altimeter [m]
# name 9 = sbecoO2/L: Oxygen, SBE 43 [ml/l]
# name 10 = flECO-AFL: Fluorescence, Wetlab ECO-AFL/FL [mg/m^3]
# name 11 = xmssr: Beam Transmission, Chelsea/Seatech/Wetlab CStar [%]
# name 12 = v0: Voltage 0
# name 13 = v1: Voltage 1
# name 14 = v2: Voltage 2
# name 15 = v3: Voltage 3
# name 16 = v4: Voltage 4
# name 17 = v6: Voltage 6
# name 18 = v7: Voltage 7
# name 19 = v8: Voltage 8
# name 20 = v9: Voltage 9
# name 21 = v10: Voltage 10
# name 22 = v11: Voltage 11
# name 23 = v12: Voltage 12
# name 24 = v13: Voltage 13
# name 25 = v14: Voltage 14
# name 26 = v15: Voltage 15
# name 27 = v16: Voltage 16
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# name 611 = v600: Voltage 600
# name 612 =
```


Extended Metadata Support in ODV

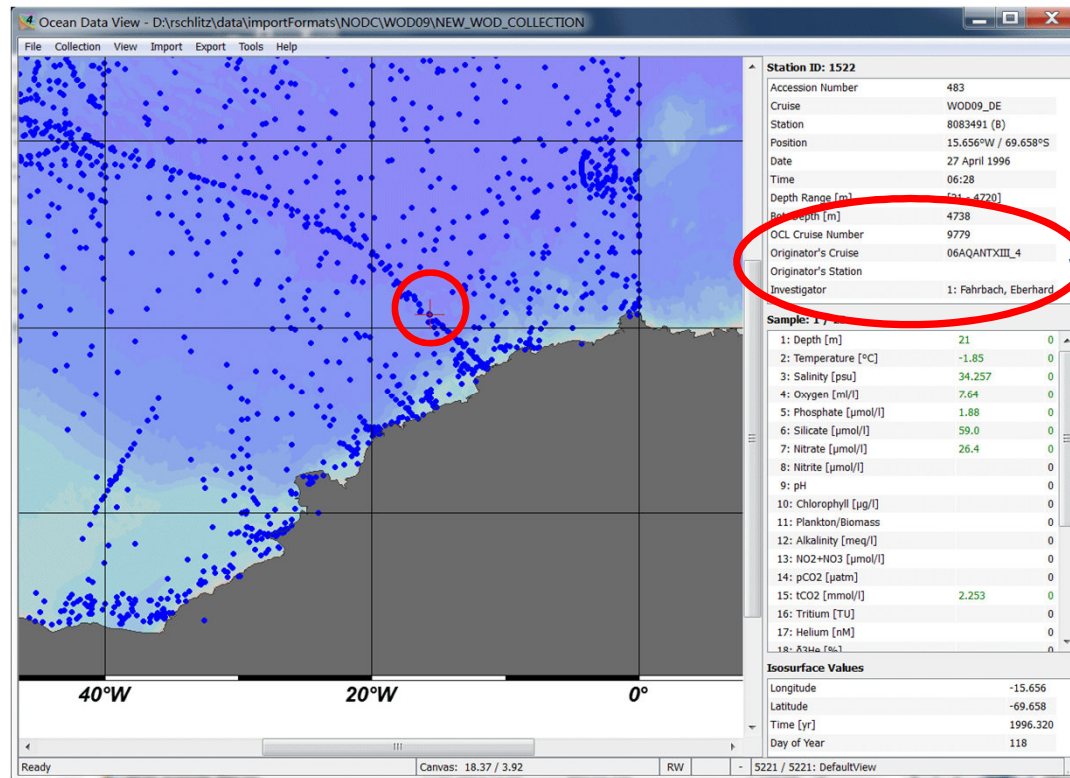
Example: *SeaDataNet Data*



LOCAL_CDI_ID (clickable)
EDMO_code (clickable)
Platform Type
Instrument / Gear Type
Originator
CDI-Record ID
Data Set Name
Category
CDI-Record Creation Date
CDI-Partner
Reference (clickable)

Extended Metadata Support in ODV

Example: *World Ocean Database*



OCL Cruise Number
Originator's Cruise
Originator's Station
Investigator Names

2. ODV Application Programming Interface (API)

ODV collection format...

- ***Accommodates many data types***
- ***Provides dense storage***
- ***Allows very fast random access***
- ***Is platform independent***

Past:

Data in ODV collections only accessible via Ocean Data View Software.

Future:

Provide ODV Application Programming Interface (API) allowing developers to create their own data access applications for ...

custom QC

scientific data processing

web-based data delivery

...

What it consists of:

- ***Set of header files providing the interface (ODV classes and functions; to be included in user code)***
- ***Platform-specific compiled library to link against (Windows: odv4api.dll; Linux: libodv4api.so; Mac OSX: libodv4ap.dylib)***
- ***Set of documentation and example files***
- ***Supported languages: C++ (native), Java***

Features provided:

- ***Read access to data, metadata and quality flag values in ODV collections (all formats, including the new ODVCF6)***
- ***ReadWrite access will be added in future version***
- ***User application code is platform independent (Windows, Mac OS X, Linux, Unix)***

Key Concepts:

ODVCollection

- *Holds values for arbitrary numbers of metadata and data variables for an arbitrary number of stations.*

ODVVariable

- *Represents a metadata or data variable and holds its properties.*

ODVStation

- *Represents sampling event with given space/time coordinates. Holds one value per metadata variable, and data values for every data variable and sample. Also holds quality flags for all metadata and data values.*

C++ Example Code (1/2)

```
/* create an ODVCollection object and open the collection in ReadOnly mode */
ODVCollection collection("c:/odv/test_collection.odv");
ODV::Status status=collection.open(ODV::ReadOnly);

/* retrieve number of metadata and data variables in collection */
int metaVarCount=collection.metaVarCount();
int dataVarCount=collection.basicVarCount();

/* obtain pointer to metadata variable varID (0-based index) */
ODVVariable *var=collection.metaVar(varID);

/* obtain pointer to data variable varID (0-based index) */
ODVVariable *var=collection.var(varID);

/* retrieve number of stations in collection */
int stationCount=collection.stationCount();

/* create an ODVStation object and read data of station statID in
   the collection. note that station IDs used in the readData() call
   are zero-based integers, e.g. 11 for 12th station. */
ODVStation station(&collection);
station.readData(statID);
```


C++ Example Code (2/2)

```
/* retrieve various metadata values */
QString cruiseLabel=station.metaStringValue(ODVStation::MetaCruiseIndex);
QString stationLabel=station.metaStringValue(ODVStation::MetaStationIndex);
double lon=station.metaLongitude();
double lat=station.metaLatitude();

/* retrieve number of samples */
int sampleCount=station.sampleCount();

/* retrieve the data and quality flag values for sample sampleID of
   variable varID. note that sample IDs and variable IDs are 0-based
   integers. */

/* obtain pointer to data variable varID (0-based index) */
ODVVariable *var=collection.var(varID);

/* retrieve data value and quality flag for this variable for sample sampleID */
char qFlag;
double dValue=station.value(var,sampleID,&qFlag);

/* retrieve pointer to data for this variable and access value for
   sample sampleID via this pointer */
double *dPtr=station.data(var);
dValue=dPtr[sampleID];

/* close the collection */
collection.close();
```

ODV4API ODVStation x

file:///Z:/ODV4API/release/c++/Doc/class_o_d_v_station.html#a7828e345f36c63997e465ed7b6c07cde

AWI ODV Data Documents eJournals Shops Software Travel Weather

ODV4API 0.5

Main PageClassesFiles

Class ListClass HierarchyClass Members

ODV4API

ODV 4 C++ Application Programming

Classes

Class List

ODV

ODVCollection

ODVCollectionDescription

ODVCompositelabel

ODVQualityFlagSet

ODVSampleFilter

ODVStation

MetaVarIndex

ODVStation

accessionNumber

applySampleFilter

clear

double * ODVStation::data (ODVVariable * var, bool filtered = false)

virtual

Returns a pointer to the double data values of variable *var*, or NULL if *var* is NULL, meta, derived or non-numeric, or there are no samples.

The data are filtered using the station's sample filter if *filtered* is true. Values not passing the filter are set to **ODV::missDOUBLE**.

Referenced by value().

int ODVStation::dataCount (int varID) const

Returns

The number of non-miss values of variable with ID *varID* as recorded in the station metadata.

QStringList ODVStation::historyStrings () const

Returns

Retrieves all history strings for this station.

Returns

The list of strings.

QString ODVStation::identifierHeaderString (bool withID = false, bool withBrackets = false)

Returns

The description of the station identifier string contents.

See Also

metaFullName(). identifierString()

ODVStation

1.8.4

Generated on Thu Sep 19 2013 12:38:15 for ODV4API by doxygen

Availability:

- ***C++ and Java test versions available (personal contact or e-mail)***
- ***Beta status (tested in-house, Java version tested by IFREMER)***
- ***Planned release fall 2013, together with ODV 4.6.0***

Other Languages:

- ***Versions for **Perl, PHP, Python, Tcl, Ruby, C#, R, Octave, GO** or **D** can be produced using SWIG wrapper technology.***
- ***We seek cooperation with partners, if support for these additional languages is requested.***